Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A thermomechanical process for hot rolling high-strength low-alloy steel made by compact strip production into a thin slab, the process comprising:

deforming the thin slab at least at one roll stand in the full recrystallization region of austenite in the steel; and

next deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature of the austenite in the steel, wherein the steel develops a substantially homogeneous ferrite microstructure.

Claim 2 (original): The thermomechanical process of claim 1, wherein deforming the thin slab at least at one roll stand in the full recrystallization region comprises deforming the thin slab at first and second roll stands, and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a third roll stand.

Claim 3 (original): The thermomechanical process of claim 2, wherein the interpass time from exit of the thin slab from the second roll stand to entry of the third roll stand is greater than the interpass time from exit of the thin slab from the first roll stand to the entry of the second roll stand.

Claim 4 (currently amended): The thermomechanical process of claim 2, wherein deforming the thin slab at first and second roll stands comprises deforming the thin slab at least approximately -~~0.60 at each~~ -0.78 at the first roll stand and at least approximately -0.65 at the second roll stand, expressed in true reduction strain.

Claim 5 (original): The thermomechanical process of claim 2, wherein deforming the thin slab at first and second roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 6 (original): The thermomechanical process as recited in claim 1, wherein the steel has a composition comprising: $0.01 \leq C \leq 0.20$; $0.5 \leq Mn \leq 3.0$; $0.005 \leq N \leq 0.03$; $0 \leq S \leq 0.1$; $0 \leq Al \leq 2.0$; $0 \leq Si \leq 2.0$; $0 \leq Cr \leq 2.0$; $0 \leq Mo \leq 1.0$; $0 \leq Cu \leq 3.0$; $0 \leq Ni \leq 1.5$; $0 \leq B \leq 0.1$; $0 \leq P \leq 0.5$; and at least one element selected from the group consisting of $0 \leq Nb \leq 0.2$; $0 \leq Ti \leq 0.12$; and $0 \leq V \leq 0.15$, with the balance being iron and incidental impurities.

Claim 7 (original): The thermomechanical process of claim 1, wherein deforming the thin slab at least at one roll stand in the full recrystallization region comprises deforming the thin slab at first, second, and third roll stands, and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a fourth roll stand.

Claim 8 (original): The thermomechanical process of claim 7, wherein the interpass time from exit of the thin slab from the third roll stand to entry of the fourth roll stand is greater than the interpass time from exit of the thin slab from the second roll stand to the entry of the third roll stand.

Claim 9 (original): The thermomechanical process of claim 7, wherein deforming the thin slab at first, second, and third roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 10 (original): The thermomechanical process of claim 1, wherein deforming the thin slab at least at one roll stand in the full recrystallization region comprises deforming the thin slab at first, second, third, and fourth roll stands and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a fifth roll stand.

Claim 11 (original): The thermomechanical process of claim 10, wherein the interpass time from exit of the thin slab from the fourth roll stand to entry of the fifth roll stand is greater than the

interpass time from exit of the thin slab from the third roll stand to the entry of the fourth roll stand.

Claim 12 (original): The thermomechanical process of claim 10, wherein deforming the thin slab at first, second, third, and fourth roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 13 (original): The thermomechanical process of claim 1, wherein deforming the thin slab at least at one roll stand in the full recrystallization region comprises deforming the thin slab at first, second, third, fourth, and fifth roll stands and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a sixth roll stand.

Claim 14 (original): The thermomechanical process of claim 13, wherein the interpass time from exit of the thin slab from the fifth roll stand to entry of the sixth roll stand is greater than the interpass time from exit of the thin slab from the fourth roll stand to the entry of the fifth roll stand.

Claim 15 (original): The thermomechanical process of claim 13, wherein deforming the thin slab at first, second, third, fourth, and fifth roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 16 (original): The thermomechanical process of claim 1, wherein deforming the thin slab at least at one roll stand in the full recrystallization region comprises deforming the thin slab at first, second, third, fourth, fifth, and sixth roll stands and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a seventh roll stand.

Claim 17 (original): The thermomechanical process of claim 16, wherein the interpass time from exit of the thin slab from the sixth roll stand to entry of the seventh roll stand is greater than the

interpass time from exit of the thin slab from the fifth roll stand to the entry of the sixth roll stand.

Claim 18 (original): The thermomechanical process of claim 16, wherein deforming the thin slab at first, second, third, fourth, fifth, and sixth roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 19 (currently amended): A thermomechanical process for hot rolling high-strength low-alloy steel made by compact strip production into a thin slab, the process comprising:

deforming the thin slab at from two to four initial roll stands at least approximately -1.39, expressed in cumulative true reduction strain, in the full recrystallization region of austenite in the steel;

allowing adequate time to pass to permit static recrystallization of the austenite in the steel prior to additional deformation; and

deforming the thin slab at up to four final roll stands in the region below the recrystallization stop temperature of the austenite in the steel,

wherein the steel develops a substantially homogeneous ferrite microstructure.

Claim 20 (currently amended): A thermomechanical process for hot rolling high-strength low-alloy steel made by compact strip production into a thin slab, the process comprising:

rolling thin slab cast steel through initial, central, and final roll stands; and

deforming the thin slab only at the initial roll stand or roll stands in the full recrystallization region of austenite in the steel and at the final roll stand or roll stands in the region below the recrystallization stop temperature of the austenite in the steel, omitting deformation at least at one selected central ~~strand~~ stand,

wherein the steel develops a substantially homogeneous ferrite microstructure.

Claim 21 (original): A thermomechanical process as recited in claim 20, wherein the interpass time between roll stands adjacent to the central roll stand or roll stands where no deformation occurs is greater than the interpass time between the immediately preceding two roll stands.

Claim 22 (currently amended): A deformation process for hot rolling high-strength low-alloy steel made by compact strip product into a thin slab, the deformation process consisting of:

deforming the thin slab in the full recrystallization region of austenite in the steel; and

subsequently deforming the thin slab in the region below the recrystallization stop temperature of the austenite in the steel,

wherein the steel develops a substantially homogeneous ferrite microstructure.

Claim 23 (original): The deformation process of claim 22, wherein deforming the thin slab in the full recrystallization region comprises deforming the thin slab at first and second roll stands, and deforming the thin slab in the region below the recrystallization stop temperature comprises deforming the thin slab at least at a third roll stand.

Claim 24 (original): The deformation process of claim 23, wherein the interpass time from exit of the thin slab from the second roll stand to entry of the third roll stand is greater than the interpass time from exit of the thin slab from the first roll stand to the entry of the second roll stand.

Claim 25 (currently amended): The deformation process of claim 23, wherein deforming the thin slab at the first and second roll stands comprises deforming the thin slab at least approximately ~~-0.60 at each~~ -0.78 at the first roll stand and at least approximately -0.65 at the second roll stand, expressed in true reduction strain.

Claim 26 (original): The deformation process of claim 22, wherein the steel has a composition comprising: $0.01 \leq C \leq 0.20$; $0.5 \leq Mn \leq 3.0$; $0.005 \leq N \leq 0.03$; $0 \leq S \leq 0.1$; $0 \leq Al \leq 2.0$; $0 \leq Si \leq 2.0$; $0 \leq Cr \leq 2.0$; $0 \leq Mo \leq 1.0$; $0 \leq Cu \leq 3.0$; $0 \leq Ni \leq 1.5$; $0 \leq B \leq 0.1$; $0 \leq P \leq 0.5$; and at least one element selected from the group consisting of $0 \leq Nb \leq 0.2$; $0 \leq Ti \leq 0.12$; and $0 \leq V \leq 0.15$, with the balance being iron and incidental impurities.

Claim 27 (currently amended): A thermomechanical process for making high-strength low-alloy steel by compact strip production, the process comprising:

adding at least one microalloying element to a molten steel;

continuously casting the molten steel as a thin slab with an approximate thickness of from 25 mm to 100 mm;

thermally equilibrating the thin slab to a temperature suitable for hot rolling in the full recrystallization region of austenite in the steel;

deforming the thin slab at from two to four initial roll stands at least approximately -1.39, expressed in cumulative true reduction strain, in the full recrystallization region of the austenite in the steel; and

next deforming the thin slab at up to four final roll stands in the region below the recrystallization stop temperature of the austenite in the steel,
wherein the steel develops a substantially homogeneous ferrite microstructure.

Claim 28 (new): The thermomechanical process of claim 1, wherein the ferrite is acicular ferrite.

Claim 29 (new): The thermomechanical process of claim 19, wherein the ferrite is acicular ferrite.

Claim 30 (new): The thermomechanical process of claim 20, wherein the ferrite is acicular ferrite.

Claim 31 (new): The deformation process of claim 22, wherein the ferrite is acicular ferrite.

Claim 32 (new): The thermomechanical process of claim 27, wherein the ferrite is acicular ferrite.

Claim 33 (new): A thermomechanical process for hot rolling high-strength low-alloy steel made by compact strip production into a thin slab, the process comprising:

deforming the thin slab at one roll stand in the full recrystallization region of austenite in the steel;

without time elapsing to allow complete recrystallization of the austenite in the steel, deforming the thin slab at one or more additional roll stands in the full recrystallization region of austenite in the steel; and

next deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature of the austenite in the steel.

Claim 34 (new): The thermomechanical process of claim 33, wherein deforming the thin slab at roll stands in the full recrystallization region comprises deforming the thin slab at first and second roll stands, and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a third roll stand.

Claim 35 (new): The thermomechanical process of claim 34, wherein the interpass time from exit of the thin slab from the second roll stand to entry of the third roll stand is greater than the interpass time from exit of the thin slab from the first roll stand to the entry of the second roll stand.

Claim 36 (new): The thermomechanical process of claim 34, wherein deforming the thin slab at first and second roll stands comprises deforming the thin slab at least approximately -0.78 at the first roll stand and at least approximately -0.65 at the second roll stand, expressed in true reduction strain.

Claim 37 (new): The thermomechanical process of claim 34, wherein deforming the thin slab at first and second roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 38 (new): The thermomechanical process as recited in claim 33, wherein the steel has a composition comprising: $0.01 \leq C \leq 0.20$; $0.5 \leq Mn \leq 3.0$; $0.005 \leq N \leq 0.03$; $0 \leq S \leq 0.1$; $0 \leq Al \leq 2.0$; $0 \leq Si \leq 2.0$; $0 \leq Cr \leq 2.0$; $0 \leq Mo \leq 1.0$; $0 \leq Cu \leq 3.0$; $0 \leq Ni \leq 1.5$; $0 \leq B \leq 0.1$; $0 \leq P \leq 0.5$; and at least one element selected from the group consisting of $0 \leq Nb \leq 0.2$; $0 \leq Ti \leq 0.12$; and $0 \leq V \leq 0.15$, with the balance being iron and incidental impurities.

Claim 39 (new): The thermomechanical process of claim 33, wherein deforming the thin slab at least at one roll stand in the full recrystallization region comprises deforming the thin slab at first, second, and third roll stands, and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a fourth roll stand.

Claim 40 (new): The thermomechanical process of claim 39, wherein the interpass time from exit of the thin slab from the third roll stand to entry of the fourth roll stand is greater than the interpass time from exit of the thin slab from the second roll stand to the entry of the third roll stand.

Claim 41 (new): The thermomechanical process of claim 39, wherein deforming the thin slab at first, second, and third roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 42 (new): The thermomechanical process of claim 33, wherein deforming the thin slab at least at one roll stand in the full recrystallization region comprises deforming the thin slab at first, second, third, and fourth roll stands and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a fifth roll stand.

Claim 43 (new): The thermomechanical process of claim 42, wherein the interpass time from exit of the thin slab from the fourth roll stand to entry of the fifth roll stand is greater than the interpass time from exit of the thin slab from the third roll stand to the entry of the fourth roll stand.

Claim 44 (new): The thermomechanical process of claim 42, wherein deforming the thin slab at first, second, third, and fourth roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 45 (new): The thermomechanical process of claim 33, wherein deforming the thin slab at least at one roll stand in the full recrystallization region comprises deforming the thin slab at first, second, third, fourth, and fifth roll stands and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a sixth roll stand.

Claim 46 (new): The thermomechanical process of claim 45, wherein the interpass time from exit of the thin slab from the fifth roll stand to entry of the sixth roll stand is greater than the interpass time from exit of the thin slab from the fourth roll stand to the entry of the fifth roll stand.

Claim 47 (new): The thermomechanical process of claim 45, wherein deforming the thin slab at first, second, third, fourth, and fifth roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 48 (new): The thermomechanical process of claim 33, wherein deforming the thin slab at least at one roll stand in the full recrystallization region comprises deforming the thin slab at first, second, third, fourth, fifth, and sixth roll stands and deforming the thin slab at least at one roll stand in the region below the recrystallization stop temperature comprises deforming the thin slab at a seventh roll stand.

Claim 49 (new): The thermomechanical process of claim 48, wherein the interpass time from exit of the thin slab from the sixth roll stand to entry of the seventh roll stand is greater than the interpass time from exit of the thin slab from the fifth roll stand to the entry of the sixth roll stand.

Claim 50 (new): The thermomechanical process of claim 48, wherein deforming the thin slab at first, second, third, fourth, fifth, and sixth roll stands comprises deforming the thin slab at least approximately -1.39, expressed in cumulative true reduction strain.

Claim 51 (new): A thermomechanical process for hot rolling high-strength low-alloy steel made by compact strip production into a thin slab, the process comprising:

deforming the thin slab at from two to four initial roll stands at least approximately -1.39, expressed in cumulative true reduction strain, in the full recrystallization region of austenite in the steel, without time elapsing between deformations to allow complete recrystallization of the austenite in the steel;

allowing adequate time to pass to permit static recrystallization of the austenite in the steel prior to additional deformation; and

deforming the thin slab at up to four final roll stands in the region below the recrystallization stop temperature of the austenite in the steel.

Claim 52 (new): A thermomechanical process for hot rolling high-strength low-alloy steel made by compact strip production into a thin slab, the process comprising:

rolling thin slab cast steel through initial, central, and final roll stands; and

deforming the thin slab only at the initial roll stand or roll stands in the full recrystallization region of austenite in the steel, without time elapsing between deformations to allow complete recrystallization of the austenite in the steel; and

after allowing time to pass to allow complete recrystallization of the austenite in the steel, deforming the thin slab at the final roll stand or roll stands in the region below the recrystallization stop temperature of the austenite in the steel, omitting deformation at least at one selected central strand.

Claim 53 (new): A thermomechanical process as recited in claim 52, wherein the interpass time between roll stands adjacent to the central roll stand or roll stands where no deformation occurs is greater than the interpass time between the immediately preceding two roll stands.

Claim 54 (new): A thermomechanical process for making high-strength low-alloy steel by compact strip production, the process comprising:

adding at least one microalloying element to a molten steel;

continuously casting the molten steel as a thin slab with an approximate thickness of from 25 mm to 100 mm;

thermally equilibrating the thin slab to a temperature suitable for hot rolling in the full recrystallization region of austenite in the steel;

deforming the thin slab at from two to four initial roll stands at least approximately -1.39, expressed in cumulative true reduction strain, in the full recrystallization region of the austenite in the steel, without time elapsing to allow complete recrystallization of the austenite in the steel; and

next deforming the thin slab at up to four final roll stands in the region below the recrystallization stop temperature of the austenite in the steel.